

OS/2[®] WARP Server

OS/2 Warp Server Reviewer's Guide

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Preface: Purpose of the Reviewer's Guide

Welcome to IBM*'s OS/2* Warp Server¹, an integrated suite of proven server tools that provides small organizations and departments of larger organizations with a complete business server solution. Warp Server provides exactly what a large segment of the business community has been requesting--a powerful, business-ready server solution that is complete in itself, can be implemented quickly and easily without extensive technical knowledge, is easy to manage and support, and is cost-effective.

The OS/2 Warp Server Reviewer's Guide is designed to assist you as you analyze and evaluate OS/2 Warp Server, which is packed with more features and functionality than any competing product. While some components of Warp Server may be familiar, this is the first time that all have been brought together in an easy-to-deploy package.

In the following pages you will find background on the evolving client/server market that led to the development of OS/2 Warp Server, details on each component of OS/2 Warp Server, a review of the target market for OS/2 Warp Server, a recap of the competitive business server landscape, and technical specifications. Appendices provide additional technical detail and summarize the features of OS/2 Warp Server. Not included in this guide are hands-on instructions for installing and using OS/2 Warp Server. Additional information can be found in **Inside OS/2 Warp Server**, the user documentation accompanying the product.

Note: While the components that make up OS/2 Warp Server have been brought together into a single package, some documentation continues to reflect the individual components. Changes to the documentation are provided in the READ ME file.

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Introduction

Industry research confirms a trend many of you have observed: computing strategies are changing. PC LANs have widely penetrated businesses everywhere, from the Fortune 100 to small mom-and-pop operations. Originally regarded as a means to boost individual worker productivity and to share common resources through file and print serving, PC LANs increasingly provide a wide range of processing, including sophisticated database applications that support business-critical functions. The research firm International Data Corporation (IDC) noted that file and print serving accounted for 56 percent of the network operating system (NOS) market in 1993, compared with 44 percent for application serving. By 1999, however, IDC projects file and print serving to shrink to 41 percent, while application serving grows to 59 percent, indicating a clear shift to a LAN-based business applications focus.

With the growth of application serving comes the rise of client/server or network-centric computing, which is emerging as the dominant style of computing. Network-centric computing allows organizations to leverage the power of all their systems: PCs spread across desktops throughout the organization, workgroup and departmental servers, and even centralized hosts. Client/server computing gives organizations the flexibility to quickly grow and evolve their systems to take advantage of changes in the market or in the business.

Within client/server computing, three key segments have appeared: large businesses and institutions, small and midsize businesses, and departments/workgroups within organizations. Each reflects a particular set of business computing needs:

- ♦ **Large businesses and institutions**--These are organizations with sophisticated IS capabilities. They want the ability to create customized solutions tailored to their specific requirements. These organizations prefer to select and integrate the various components of the client/server environment. They want a choice of client, server, and operating environments.
- ♦ **Small and midsize businesses**--At the opposite end of the spectrum from the large organizations are small and midsize businesses. They understand that PC- and LAN-based servers are necessary tools, but they haven't the time and skills to implement and manage sophisticated client/server systems and networks. Nor might they have the resources to hire outside service providers to perform these chores. These organizations need nearly turnkey solutions that they can easily deploy, manage, and maintain on their own.

Research indicates
a clear shift to
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- ♦ **Departments/workgroups**--These groups are part of midsize and large organizations, but they have many of the same problems and concerns of small businesses. Lacking technical skills and large budgets for IS services, they too require nearly turnkey solutions that they can deploy or at least maintain on their own with only limited skills and resources. At the same time, many need to integrate their departmental solutions into the overall enterprise systems environment for the purposes of accessing data, exchanging information, sending electronic mail, and sharing applications, all of which call for an open client/server solution.

OS/2 Warp Server directly meets the needs of the small and midsize organizations and departments/workgroups. Large businesses and institutions also will find OS/2 Warp Server an effective tool for distributing client/server systems across the entire enterprise, including branch offices and satellite facilities.

Evolution Of The Server Market

As noted above, PC servers in the past were used primarily for file and print sharing. Organizations found that they could leverage common information or the capabilities of costly resources such as printers through a network-based server. Multiple users could access the files on servers and use the network to share an attached printer. Managers quickly recognized the value of networks and servers in these roles. As a result, today's organizations are widely networked for the purposes of file and printer sharing.

More recently, managers have recognized that they can achieve even greater benefits in terms of productivity, economy, and flexibility by using the network infrastructure for application serving, as well as file and print sharing. In application serving, multiple users concurrently share an application across the network. Application sharing is particularly valuable for database applications. Here the application server holds the database, manages the data and controls user access, ensuring the integrity of the data while making it available to many users. Application servers can also support a wide range of licensed software, including communications packages such as e-mail and groupware applications such as Lotus** Notes**.

Servers are no longer limited to the role of file and print sharing.

Emergence Of Business Computing

With managers widely recognizing the benefits of client/server networks and application serving in terms of productivity, flexibility, and efficiency, business units have begun seeking increased opportunities to use the client/server infrastructure to solve a wide range of business problems, reengineer business processes, streamline workflow, and improve service and quality.

The key to applying client/server solutions to business problems is to remove the technical barriers that have limited the deployment of client/server solutions in the past. The goal of OS/2 Warp Server is to enable any organization, even one with limited technical skills and resources, to implement a wide range of client/server business solutions. OS/2 Warp Server removes technical barriers to the deployment of client/server business solutions. It provides small and midsize organizations with a Fortune 500-class client/server business solution that they can afford, deploy, and manage on their own.

OS/2 Warp Server
enables *any*
organization to
implement a wide
range of business
solutions.

OS/2 Warp Server--A Business Server

OS/2 Warp Server is a true business server, designed to provide a complete business application serving solution. Users do not have to mix, match, install and configure a myriad of individual components. It handles both file and print serving and true application serving. OS/2 Warp Server is highly scalable, from small organizations with a handful of clients that require only basic networking services to organizations supporting 1000 clients or more for mission-critical work. The components that make up OS/2 Warp Server represent market-tested advanced technology of proven business value, such as OS/2 Warp and LAN Server.

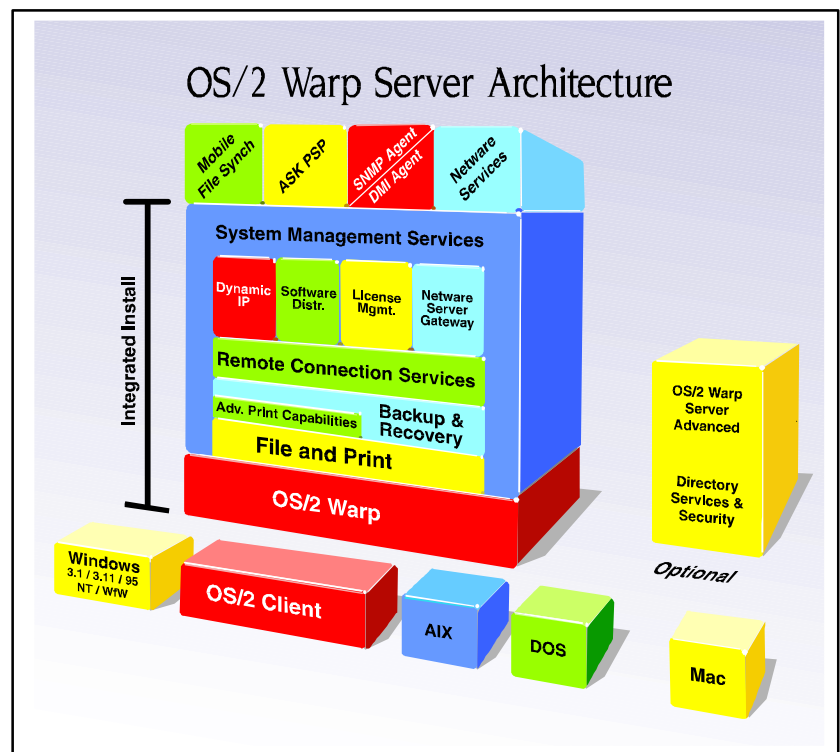
OS/2 Warp Server performs the following functions:

- ◆ File, print and resource sharing
- ◆ Application serving
- ◆ File backup and recovery
- ◆ Enhanced printer support and sharing
- ◆ Systems and network management
- ◆ Software distribution and software asset (license) management
- ◆ Remote access
- ◆ TCP/IP support and advanced communications capabilities.

In addition, a variety of OS/2 Warp Server options can be selected to extend the functionality of the basic OS/2 Warp Server. These options include Directory Security Services (DSS), LAN Server for Macintosh, and LAN Server for Ultimeida [see Optional Components].

Large organizations will find that OS/2 Warp Server interoperates with their broad variety of systems. It supports backup and recovery services to minicomputers and mainframes from such vendors as IBM, Sun Microsystems**, Hewlett-Packard**, and Digital Equipment Corp**. System Management Services provide extensive cross-platform management. Advanced Print Capabilities enable users to take advantage of a wide

OS/2 Warp Server
is market-tested,
complete, easy to
install and
maintain, and
inexpensive to
administer.



*All critical components of a
business server are delivered
in a single package.*

range of enterprise print resources transparently. OS/2 Warp Server also provides full interoperability with previous versions of LAN Server and LAN Server for AIX, LAN Server/400, and LAN Server for VM and MVS.

OS/2 Warp Server takes advantage of IBM's strength in advanced technologies such as objects, and IBM's achievements in areas such as electronic software distribution, and automated system and network management. It applies these technologies to deliver advanced ease-of-use and enhanced productivity capabilities, including drag-and-drop administration, visual automation of routine tasks such as backup, as well as automatic software/hardware discovery and resource monitoring.

OS/2 Warp Server is based on extensive market research that pinpointed the need for a complete business solution that is easy and inexpensive to deploy and administer, and doesn't require sophisticated technical skills or the complicated integration of numerous products. OS/2 Warp Server fulfills this need with one-stop shopping, combining advanced operating system performance, enhanced file and print sharing, application serving, and communications in a single, easy-to-use integrated package.

Built on proven technology, OS/2 Warp Server is an open solution supporting all the popular clients and interoperability protocols such as SNMP, DMI, NetBios, IPX, Named Pipes, and TCP/IP.

OS/2 Warp Server Advanced

OS/2 Warp Server Advanced is designed for organizations that require additional industrial-strength features. It includes everything in OS/2 Warp Server plus:

- ◆ Support for more than 120 clients using file sharing, and support for up to 1000 clients per server
- ◆ Fault tolerance through disk mirroring
- ◆ The ability to set user disk limits to better allocate and conserve system resources [see Optional Components.]

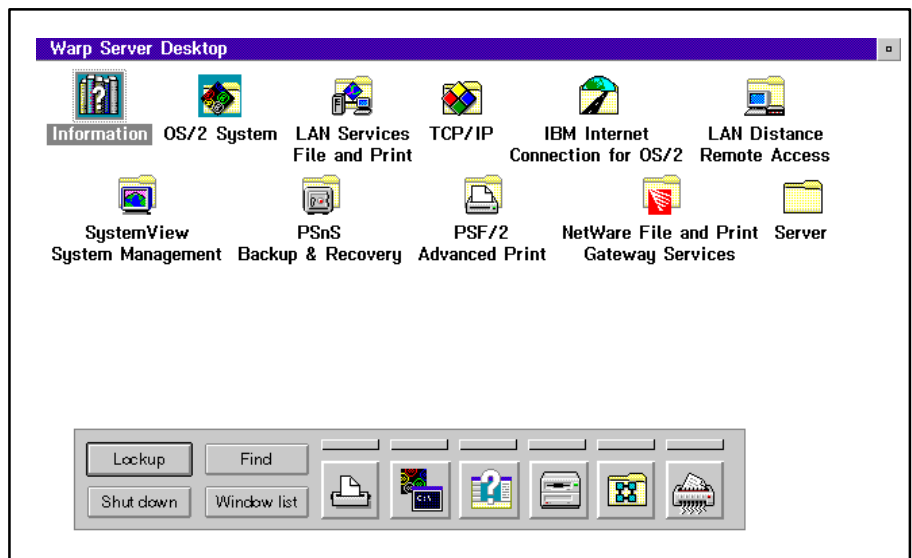
Product Component Overview

A complete package of components and options make OS/2 Warp Server the most comprehensive business solution.

Highlights

- ♦ OS/2 Warp operating system--delivers fully preemptive 32-bit multitasking with the ability to run both 16-bit DOS and Windows applications as well as 32-bit OS/2 applications. Symmetrical multiprocessing for high performance and scalability is planned for 1996.
- ♦ CD-ROM installation--an easy graphical interface provides simplified complete installation from a CD-ROM, eliminating the need to handle numerous diskettes.
- ♦ Enhanced network file and print sharing--provides networking services including a single system view of multiple servers.
- ♦ Extensive client support--works with OS/2, Windows**, Windows for Workgroups**, Windows NT**, DOS, and Windows 95** clients, as well as AIX* and Macintosh** with additional software.
- ♦ Broad desktop support--runs OS/2, and a wide array of DOS and Windows applications representing the broadest selection of applications available.
- ♦ Comprehensive, policy-driven backup and restore--enables easy automation of critical backup and restore functions.
- ♦ Fault resilience--with the latest backup devices through extensive automated backup and restore (additional backup destinations via the ADSM/2 option.)
- ♦ Drag and drop administration--object-based, easy-to-use, intuitive process using the network-aware Workplace Shell* eliminates the use of the command line, yet still allows command line input for those who prefer it.
- ♦ Remote node client access--supports users connecting from outside the corporate network.

A complete package of components and options make OS/2 Warp Server the most comprehensive business solution.



- ◆ Multi-network support--supports Novell** NetWare** Gateway, Windows NT, native LAN Manager, and native DEC PATHWORKS**.
- ◆ Advanced Printer Support--including PostScript** emulation, bi-directional communications, and automatic conversion of ASCII to PostScript and PostScript to IPDS** and PCL 4 & 5.
- ◆ Enhanced TCP/IP--a full suite of TCP/IP functionality for Internet interoperability, including FTP, gopher, NFS, a WWW browser, news reader, SMTP, Telnet, SLIP, PPP, multimedia mail, Domain Name System, Ping, Finger, X-Windows, DHCP, DDNS, and more.
- ◆ Automated system management--includes software and hardware discovery, resource monitoring, alerts, scheduling of any tasks, and remote control for both clients and servers.
- ◆ Novell NetWare interoperability--provides a variety of ways to interoperate with NetWare servers.
- ◆ Advanced options--including license management, electronic software distribution, and more.

Key Components

The two primary products in OS/2 Warp Server are OS/2 Warp, the underlying operating system, that provides industrial-strength application serving, and LAN Server, the network operating system, that provides unparalleled file and print services. In addition, OS/2 Warp Server includes the broadest array of application services of any business server on the market. The following section examines the individual components of OS/2 Warp Server.

OS/2 Warp

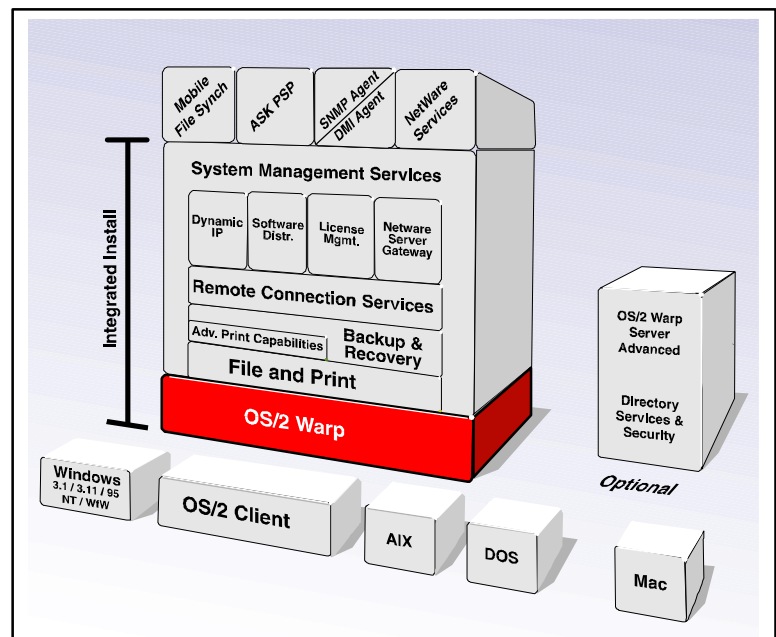
OS/2 Warp Server contains OS/2 Warp version 3, a fully preemptive, road-tested 32-bit operating system that provides crash protection and takes maximum advantage of the processor and memory. This version contains its own optimized Windows 3.1 code.

OS/2 Warp is a stable, robust, proven operating system. OS/2 has been continually enhanced for performance and reliability since its debut in 1987. It continues to provide the features and capabilities that users demand in a high-end operating system:

- ◆ 32-bit performance
- ◆ Preemptive multitasking
- ◆ Multithreading
- ◆ Inter-process communications
- ◆ Virtual memory management
- ◆ State-of-the-art object-oriented user interface, the Workplace Shell
- ◆ Unequaled support for legacy DOS and Windows applications

Reliability enhancements include support for multiple backup sets of key system files (CONFIG.SYS, OS2.INI, OS2SYS.INI and more), that can be recalled at boot time. A diagnostic boot capability displays the name of each device driver as it is loaded to expedite the diagnosis of device driver-related boot failures. Another feature enables users to create emergency boot diskettes that let users work around and correct boot failures. Other reliability features include disk mirroring (Advanced Server), disk duplexing, and support for RAID and uninterruptible power supplies.

Since 1987, OS/2 has been market-tested and refined, with enhanced features, reduction in size, and increased reliability.



OS/2 Warp sports improved and expanded device driver support, including support for the industry's leading 32-bit graphics accelerators, as well as numerous multimedia and SCSI drivers.

OS/2 has evolved into a powerful application server operating system based on its 32-bit performance, strong multithreading and multiprocessing capabilities, and connectivity to networks, platforms, databases, and applications. OS/2 can easily integrate clients with transaction processors, middleware services, and application environments.

OS/2 Warp scales its performance for application serving by distributing application threads among processors to optimize the capabilities of a multiprocessing computer. As a pre-emptive, multitasking operating system, OS/2 Warp intelligently allocates processing resources automatically.

OS/2 Warp offers a practical implementation of object technology. It provides the freedom to incorporate object technology when and where it is most appropriate. The OS/2 architecture allows the coexistence of object-oriented programs and procedural programs, thus enabling a gradual migration to object technology as developers integrate new object-oriented applications into existing environments.

With OS/2 Warp as its base operating system, OS/2 Warp Server enjoys industry-leading performance, application compatibility, reliability, and ease of use.

OS/2 delivers
application serving
through its 32-bit
multithreading and
multitasking
performance, and
broad connectivity.

File and Print

OS/2 Warp Server inherits LAN serving capabilities from LAN Server 4.0, a proven network file, print, and modem sharing technology with an excellent business track record. It provides:

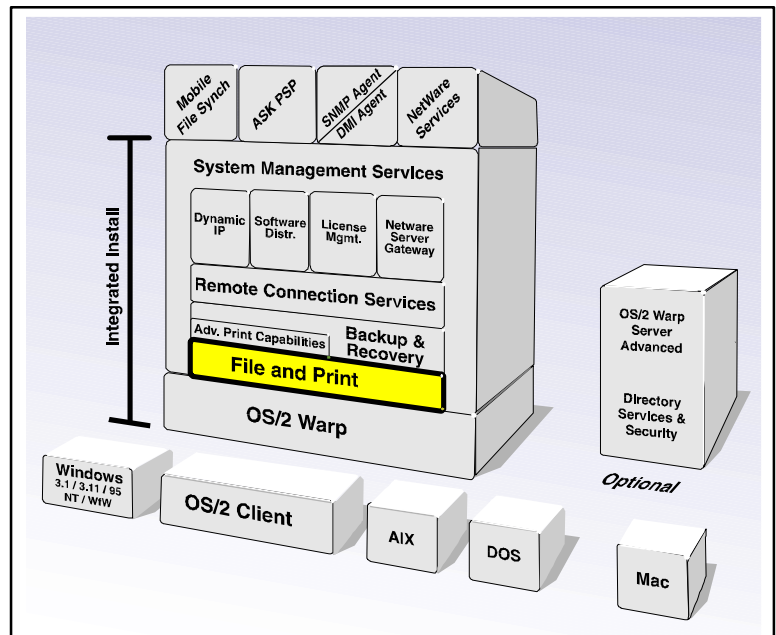
- ◆ Industrial strength performance
- ◆ Simplified administration
- ◆ Flexible growth
- ◆ Support for other client and network operating systems
- ◆ Built-in peer-to-peer support for workgroups
- ◆ File and print services
- ◆ Application sharing.

OS/2 Warp Server supports the wide range of clients found in the business environment. An open system, it supports TCP/IP, the industry communications standard, as well as other protocols, such as NetBEUI. A powerful graphical user interface allows administrators to perform the full range of setup, maintenance, and administrative functions with drag-and-drop, point-and-click ease. Unlike other network operating systems that mainly handle file and print sharing, OS/2 Warp Server is fully capable of robust application serving.

File and print capability has been enhanced in the following ways:

- ◆ Extensive, automated network adapter detection and configuration
- ◆ Support for hundreds of Ethernet and Token-Ring adapters
- ◆ Advanced support for TCP/IP
- ◆ Support for multiple concurrent communications protocols, including NetBIOS, TCP/IP, or SPX
- ◆ Domain Naming Services for easy access to resources anywhere on the network
- ◆ Peer-to-peer services for DOS, Windows, and OS/2 clients
- ◆ Improved performance for DOS and DOS/Windows client requesters
- ◆ Direct support for Windows for Workgroups, Windows 95, and Windows NT clients

As an open system, OS/2 Warp Server supports the wide range of clients and client applications found in the business environment.



- ♦ Fault tolerance through support for multiple disk drives, enabling OS/2 Warp Server to mirror data on another drive (available in OS/2 Warp Server Advanced)
- ♦ Network SignON Coordinator which synchronizes client logons across multiple domains, IBM mainframes, minicomputers, and NetWare 3.1x servers resulting in a single network logon
- ♦ Tuning Assistant which intelligently changes server configuration settings to the exact network environment to maximize server performance
- ♦ Tools to manage disk space and notify users and administrators when usage is approaching established limits (Advanced Server only)
- ♦ Exploitation of Pentium** processors
- ♦ Support for IBM's Configuration, Installation, Distribution (CID) utility, which enables the automatic installation and upgrade of system software, applications, drivers, and utilities over the network, saving hundreds if not thousands of hours of labor involved in manual upgrades.

Remote Connection Service (RCS)

Remote Connection Service (RCS) enables remote access to OS/2 Warp Server, effectively extending the office to the remote mobile or home-based user. It allows a remote user to access all the services and resources available through OS/2 Warp Server and the LAN via a telephone line.

Based on LAN Distance*, OS/2 Warp Server RCS provides the following types of connectivity: remote to LAN, remote to remote, LAN to remote, LAN to LAN.

RCS enables OS/2 Warp Server to act as a connection server for remote clients. The connection server component provides security and routing capabilities. The connection server allows simultaneous LAN access for multiple users. The number of concurrent connections is determined by the type of communications adapter, communication speeds, the type of protocol, and the processing power of the server hardware. As a software product, OS/2 Warp Server is highly scalable, allowing organizations to upgrade to more powerful hardware platforms as the need arises. A 486-based server has been tested for 32 connections. Communication-card vendors provide hardware that supports up to 128 connections.

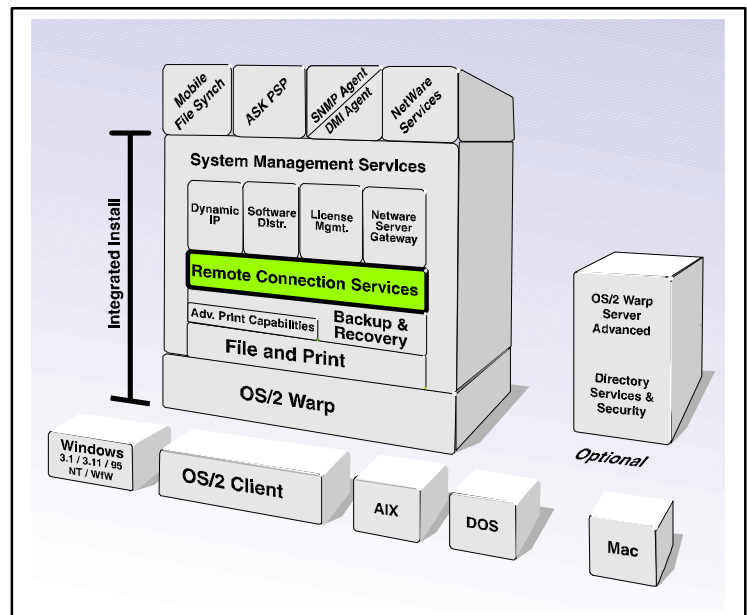
The following adapters have been certified as running with RCS: IBM ARTIC Multiport Adapter (supports 8 lines per adapter at speeds up to 38.4K BPS); Digiboard Avastar 200 Adapter (support 8 or 16 lines per adapter at speeds up to 115K BPS); and VRC Spice Adapter (supports 9/128 lines with expansion box at speeds up to 115K BPS).

On the client side, remote clients run LAN Distance client software, which is included in OS/2 Warp Server, or OS/2 Warp Connect, which includes the LAN Distance client along with other facilities for widespread remote connectivity.

RCS has been enhanced for OS/2 Warp Server with improved usability and stability, an inactivity timer, the ability of multiple connection servers to share a single security database, and batch tools for accessing security.

OS/2 Warp Server transforms the remote system into a fully functioning LAN client. Users working away from the office use

OS/2 Warp Server
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LAN client.



Remote LAN Access to access the LAN over public telephone lines and run OS/2 Warp Server applications and services. The remote workstation does not require any LAN-specific hardware to connect to OS/2 Warp Server.

RCS works well with popular client/server applications, including Lotus Notes, DB2**, WWW, Oracle**, SQL Server, Btrieve**, and more.

RCS delivers the following features:

- ◆ Support for OS/2 and Windows PCs, running NDIS or ODI as the client driver
- ◆ Information collection to provide data on user connection time, port use, and traffic for use in planning and chargeback
- ◆ Support for call status information, error logging, problem tracing, automatic filters, and error condition alerts to ensure ease of troubleshooting and maximum availability of network resources
- ◆ Support for a wide range of LANs and WANs: Token Ring and Ethernet LANs, as well as asynchronous, synchronous, ISDN, and X.25 remote connections
- ◆ Support for a wide range of communications protocols: NetBIOS, NetBEUI, TCP/IP, IPX, SNA, and 802.2
- ◆ Robust security including user identification and classification, defined access privileges, long passwords (passphrases), token-passing internal security, support for third-party authentication, standards-based encryption and message authentication codes, optional user call-back, access restrictions by time and date, and more
- ◆ Extensive network management features, including SNMP, OS/2 CMIP, FFST/2, NetView** alerts, trace, error logging, and packet volumes
- ◆ LAN-to-LAN bridging by which the LAN-attached workstation dials a remote server or workstation
- ◆ High performance and scalability through transparent bridging
- ◆ Support for a wide range of Name Servers.

Advanced Print Sharing--Print Services Facility for OS/2 Warp Server (PSF/2)

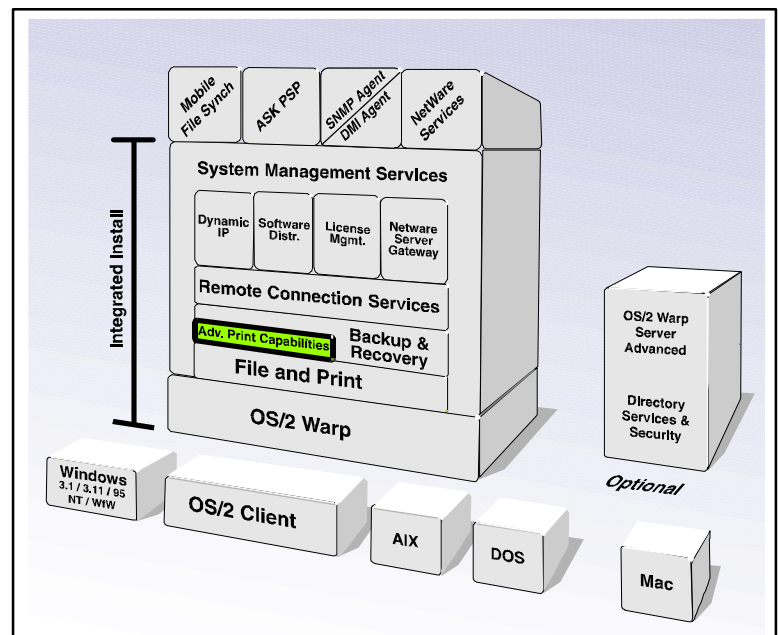
In addition to the many standard ways of printing with OS/2, such as dragging a file to a printer icon or selecting PRINT from a menu, OS/2 Warp Server provides sophisticated multiprotocol printing through the Print Services Facility (PSF/2) and the Advanced Network Printing Solution, which consists of the Enhanced OS/2 Warp Server Print System, HP** JetAdmin, and Lexmark MarkVision for OS/2. These products are fully integrated with OS/2 Warp Server.

OS/2 Warp Server eliminates the wasted time and resources that occur when print output is directed to the wrong printer, as in the case of a PostScript file directed to a non-PostScript printer. This capability saves money by ensuring that all print jobs are printed correctly on the selected printer, regardless of the job's data stream. In addition, PSF/2 supports high-speed LAN-based printing, making OS/2 Warp Server the only LAN-based business server to support high volume (300 page/minute) printers. Finally, OS/2 Warp Server reduces print administration effort by eliminating the need to manage printer drivers on the client system. Print drivers are handled on the server instead, a more efficient approach that reduces the cost of ownership.

Like any advanced OS/2 application, PSF/2 uses a drag-and-drop interface that allows users to drag any file and drop it on any printer for printing without concern about matching the print protocol with the printer. With PSF/2, OS/2 Warp Server automatically converts:

- ◆ ASCII to PostScript
- ◆ PostScript to IPDS
- ◆ PostScript to HP- PCL 4, 5 (no PostScript support is required in the printer.)

Advanced print sharing effectively eliminates productivity-killers such as PostScript output being directed to non-PostScript printers.



Using the server to precompile PostScript output, PSF/2 is able to achieve high performance, enabling printers to run at their rated speeds.

Through PSF/2, OS/2 Warp Server delivers the following features:

- ◆ Support for 300 page-per-minute output, the fastest in the industry
- ◆ Drag-and-drop printing for ease of use
- ◆ Support for up to 16 printers simultaneously, ranging in speeds of 4 to 300 pages/minute; more than 24 printers can be assigned to an OS/2 Warp Server print server
- ◆ Print protocol translation for major printer protocols, eliminating the problems and waste involved in printing to the wrong printer
- ◆ Support for very high-speed, high-volume printing, which previously has been limited to host-based printing
- ◆ Server-based precompiling to achieve full rated printer speed
- ◆ Support for PostScript, HP-PCL, and AFPDS data streams
- ◆ Advanced AFP* job management capabilities such as accounting, audit, and page-level error recovery
- ◆ Remote setup, configuration, and management of PSF/2 for OS/2 Warp Server and its printers from an OS/2 desktop
- ◆ Transferral of print jobs between OS/2 Warp Server and host printers (when Host PSF/2 is installed)
- ◆ Support for HP and Lexmark network-attached printers, connected via Token Ring or Ethernet
- ◆ Display of actual print job and printer status at the user desktop, thereby eliminating trips to the printer
- ◆ Centralized setup and access control of network printers
- ◆ Remote monitoring, configuration, and management of network attached printers
- ◆ Automatic installation of correct OS/2 printer drivers on OS/2 clients.

OS/2 Warp Server provides bi-directional (bi-di) print support. Bi-di printers can send information to the system about their status, conditions requiring operator intervention, error, statistics, and so on. For example, if the printer is out of paper or is jammed, a bi-di printer sends the appropriate message instead of just indicating that the print jobs are still waiting in queue. Otherwise, someone has to physically go to the printer to see what is causing the delay.

Two GUI components that make use of OS/2 Warp Server's bi-di support are MarkVision** for OS/2 by Lexmark** International Inc.

and HP JetAdmin** for IBM OS/2 Warp Server by Hewlett-Packard. These products support, respectively, the Lexmark Optra** and 4039 Plus families of printers and a wide range of HP printers and plotters including the HP LaserJet** 4, 4M, 4 Plus, 4M Plus, HP Color LaserJet, HP DeskJet** 1200C and 1200C/PS, HP LaserJet 3, HP LaserJet 5P, 5MP, and more.

Backup and Recovery

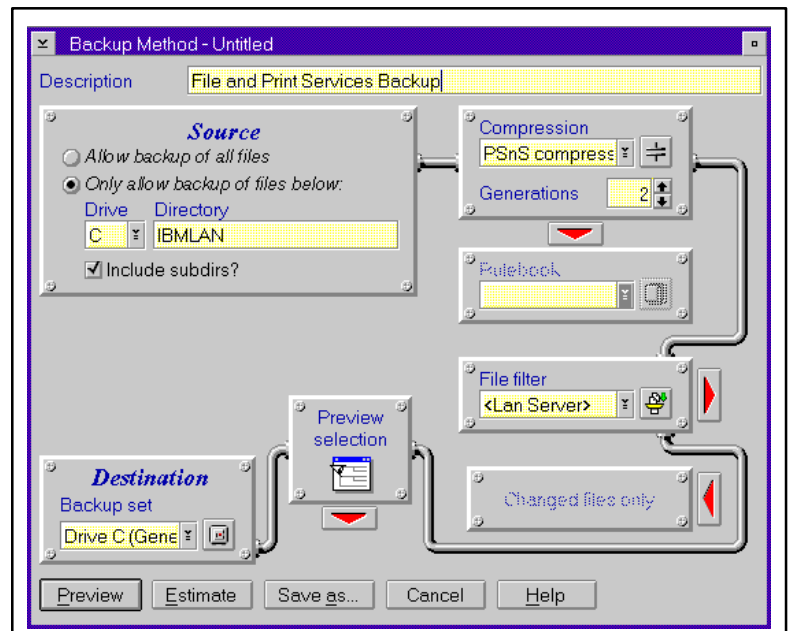
OS/2 Warp Server reliably handles an organization's mission-critical information and applications by providing a comprehensive backup, restore, and recovery capability. This is a key requirement for a reliable business server, but it is an area that often suffers with other PC-based servers. OS/2 Warp Server benefits from IBM's extensive experience with mission-critical, enterprise-wide backup, restore, and recovery combined with the intuitive graphical interface of Personally Safe n' Sound (PSnS).

OS/2 Warp Server includes Backup and Recovery Services that incorporate IBM's PSnS, a graphical user interface. PSnS enables administrators, working through an intuitive graphical user interface, to back up files on their system to the LAN or to a host. It can make backups automatically or manually, and restore these files selectively. Backup and Recovery Services works in the background so as not to interfere with normal operations while it automatically manages backup and recovery. The Backup and Recovery Services remembers where it backed up data using special index files. These files also are automatically backed up whenever a backup is performed, ensuring that the data will always be recoverable, even after a catastrophic disk crash.

The Disaster Recovery Utility enables the user to easily build a set of bootable diskettes that can be used to fully recover an OS/2 Warp Server system and all its files and access control lists (ACL) from any removable media to ensure full recovery in the face of a seemingly disastrous failure.

Backup and Recovery Services enables administrators to back up single or multiple OS/2 Warp Server systems using OS/2 Warp Server, NetWare, or Windows NT as the backup repository, without the need for additional software. For enterprise-wide backup and recovery in a complex, heterogeneous environment, IBM's ADSTAR* Distributed Storage Management (ADSM) service is recommended. When Backup and Recovery Services is used in conjunction with ADSM, backups can be sent to separate servers using one of the many communications protocols available, including NetBIOS, TCP/IP, APPC, and more. The central ADSM server can

The Backup and Recovery service not only can back up files automatically, it also indexes the location of the backups and backs up the indices.



run on the same machine as OS/2 Warp Server's Backup and Recovery Services or an entirely different machine, such as an IBM System/390*, AS/400*, RS/6000*, and systems from Digital Equipment Corp., Sun, and Hewlett Packard.

OS/2 Warp Server Backup and Recovery Services delivers the following features:

- ♦ Supports backup and recovery of files and critical ACLs.
- ♦ Backs up files to diskette, tape (including SCSI tape drives), optical disk, hard disk, and LAN drives (via aliases), and via redirection to NetWare and Windows NT.
- ♦ Backups can be scheduled to occur automatically with a highly flexible scheduling subsystem.
- ♦ Manual backups can be made at any time.
- ♦ Supports compression of backed up data.
- ♦ Manages backup volumes without the user having to create an administration system for backups.
- ♦ Supports sound in the form of .WAV files that can be associated with any system event.
- ♦ Graphical, drag-and-drop technology and a highly intuitive interface makes setting up the backup simple.
- ♦ Works in conjunction with ADSM and is upgradable to ADSM.

System Management Services

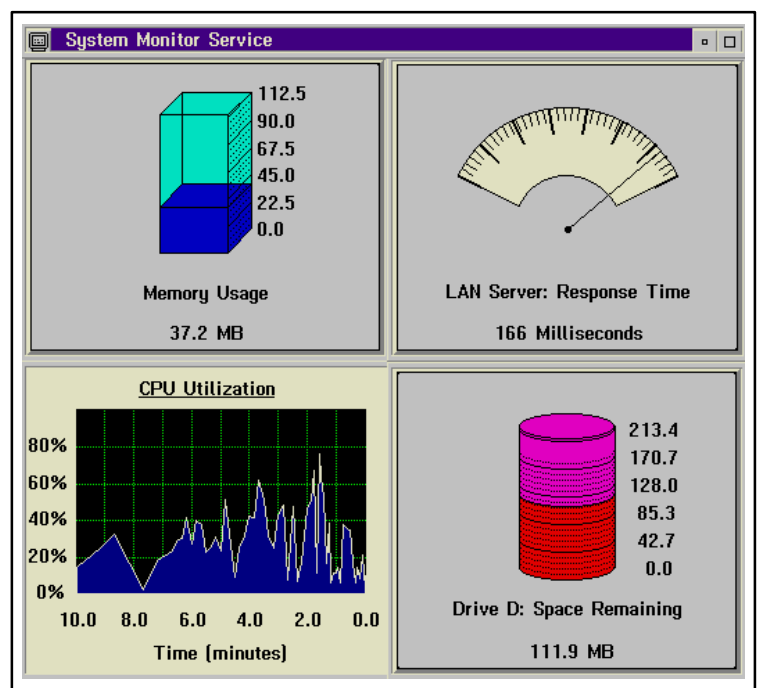
Business servers, like OS/2 Warp Server, that are capable of handling mission-critical applications and information, require robust system management capabilities that few PC-based servers provide. OS/2 Warp Server benefits from IBM's extensive experience in the management of critical business systems through IBM's proven SystemView* family of management tools.

The System Management Services for OS/2 Warp Server incorporate key IBM technologies such as NetFinity* and SystemView, IBM's family of systems management products. System Management Services address the key systems management needs for reliable business computing:

- ◆ Business management, which addresses the need to control IS assets through such tasks as license management and software/hardware discovery.
- ◆ Change management, which controls the introduction of change into the systems environment through such tasks as automated software distribution and critical file monitoring.
- ◆ Configuration management, which provides services and data to many different applications, such as software distribution.
- ◆ Operations management, which addresses the need to plan, evaluate, schedule, and control workloads.
- ◆ Problem management, which performs problem detection, analysis, recovery, tracking, and resolution, as well as speeds restoration of the system.
- ◆ Help desk support, which provides key management information to facilitate problem resolution at the help desk.
- ◆ Performance management, which addresses the effectiveness with which information systems deliver their services to users.

System Management Services enable administrators to easily view, initiate, and exploit management services for LAN-connected clients and servers. They can view hardware and software configurations, monitor usage and performance of critical components such as

System administrators can accomplish all critical management tasks remotely, and can be alerted by sound, visual pop-ups, or even



processors, disks, and memory, and identify potential errors before they become problems. It is designed to manage personal computers based on Intel processors (386SX or higher). It provides capacity management, extendability and integration of third-party packages, as well as support across server, desktop, and even mobile PCs. It also alerts administrators by sound, visual pop-ups, or even pagers (without any additional software).

System Management Services for OS/2 Warp Server provides an entry point into IBM's SystemView series of enterprise management products, enabling organizations to scale their management capabilities as their systems environment grows. Through support of industry-standard SNMP alerting and DMI instrumentation, System Management Services for OS/2 Warp Server provides a solid base for inter-platform systems management both now and in the future.

System Management Services for OS/2 Warp Server provides:

- ◆ Critical file monitoring--provides extensive information on system conditions and monitors critical system files or data files for change, as defined by the system administrator.
- ◆ Action alerts--provides alerts via VIM**-compliant e-mail and TCP/IP Send Mail; sends alerts to alphanumeric pagers; and provides visual alert condition settings so systems sending alerts can be easily identified.
- ◆ Remote dial-in support--allows dial-in support to any system equipped with NetFinity Services or NetFinity Manager and a modem, 9600 baud or higher.
- ◆ Enhanced monitor support--monitors can be selected by logical group such as Pentium, hard drive, and Swap file, and are more configurable than ever before. New monitors are included for Pentium processors, TCP/IP network protocols, system processes, network buffers, print job statistics, and system swap files. Historical monitor data can be saved as ASCII text, SQL data, or Lotus Notes database files.
- ◆ Support for database management systems--exports system information, system profile, and historical monitor data to a database such as a Lotus Notes file, relational databases, or plain text files. (There is no requirement for a database to maintain collected information, however. Users can choose to collect management information in a database if the need arises, as when the volume of information is great.)
- ◆ Software inventory--collects information about applications installed on any managed system and allows detection of

non-standard applications and executable files in addition to standard libraries of common applications.

- ◆ RAID manager--enables the administrator to view and perform functions on RAID arrays.
- ◆ Process manager--allows a remote administrator to view active processes, terminate problem processes, and initiate new processes on a remote system. Administrators can be notified if an application fails while running or fails to start.
- ◆ NMS launch capability--integrates into the Novell NetWare Management System menus so System Management Services for OS/2 Warp Server can be launched as a selectable item from within the NMS management console under Windows.
- ◆ DMI support--provides support for the industry-standard DMI alerts and allows any DMI-standard manager to access the DMI MIF file stored at each workstation. The DMI Remote Browser allows viewing of the contents of remote DMI MIF databases.
- ◆ SNMP alerting--converts alerts to SNMP alerts in real-time, allowing SNMP-based management platforms to benefit from OS/2 Warp Server's extensive monitoring capabilities. Through support for dynamic alerts directly from the managed device, OS/2 Warp Server allows for real-time notification and eliminates the LAN traffic associated with polling.
- ◆ Event Scheduler Service--provides the capability to schedule and automatically start NetFinity services on an hourly, daily, weekly, monthly, or yearly basis.
- ◆ System information improvements--provides an improved graphical display for PCI and EISA adapters, as well as the Micro Channel**, with details of adapter position and all available attributes as determined by the bus architecture and adapter.

Dynamic IP

Dynamic Host Configuration Protocol (DHCP)

TCP/IP has emerged as the communications standard between diverse systems, but TCP/IP has been notoriously difficult to use and manage. It requires the manual configuration of each client for use on a TCP/IP network, particularly for the required IP address. OS/2 Warp Server, however, simplifies the use of TCP/IP through the Dynamic Host Configuration Protocol (DHCP), which simplifies the assignment of IP addresses.

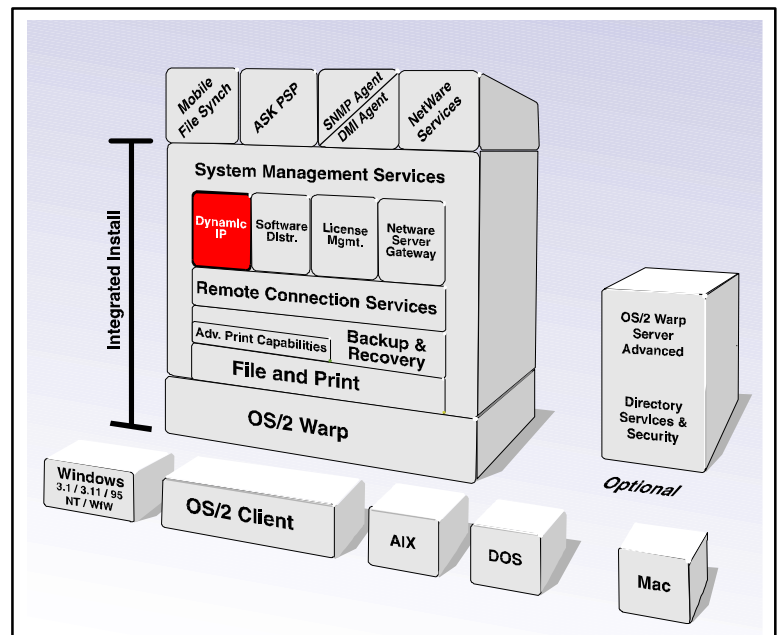
In a traditional TCP/IP network, every workstation is individually set up with an IP address. This requires an administrator or technician to visit each workstation, a time-consuming and costly process. As a result, the IP address remains almost permanently associated with the workstation because of the time and effort required to change it. With DHCP, OS/2 Warp Server acts as the central TCP/IP address source, automatically distributing TCP/IP to users on demand, saving time and money, as well as providing great convenience.

DHCP achieves this by passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BootP), adding the ability to automatically allocate available network addresses and perform other configuration options. DHCP assigns an IP address to a client for a limited amount of time, and it also offers a way to configure all necessary parameters to a client. Neither of these capabilities is possible with BootP.

DHCP delivers the following benefits:

- ♦ Automatic IP network access and host configuration
- ♦ Simplification of IP network administration
- ♦ Ability to leverage existing IP network products and infrastructure
- ♦ Based on open standards only
- ♦ Allows customers to administer site-specific host environments
- ♦ Enables customized, location-sensitive host serving
- ♦ Reduces likelihood of running out of IP addresses.

OS/2 Warp Server
has finally tamed
the notoriously
unmanageable
TCP/IP
communications
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Dynamic Domain Name Services (DDNS)

In conjunction with DHCP, OS/2 Warp Server provides Dynamic Domain Name Services (DDNS). Today's TCP/IP Domain Name System (DNS) servers support only queries on a statically configured database, but DHCP dynamically changes the address information in this database. DDNS defines extensions to DNS that allow the DNS server to accept requests to update the DNS database dynamically. These extensions provide support for automatically adding and deleting a set of names and associated resource records with a single zone. Updates are secured using private/public key technology.

Electronic Software Distribution

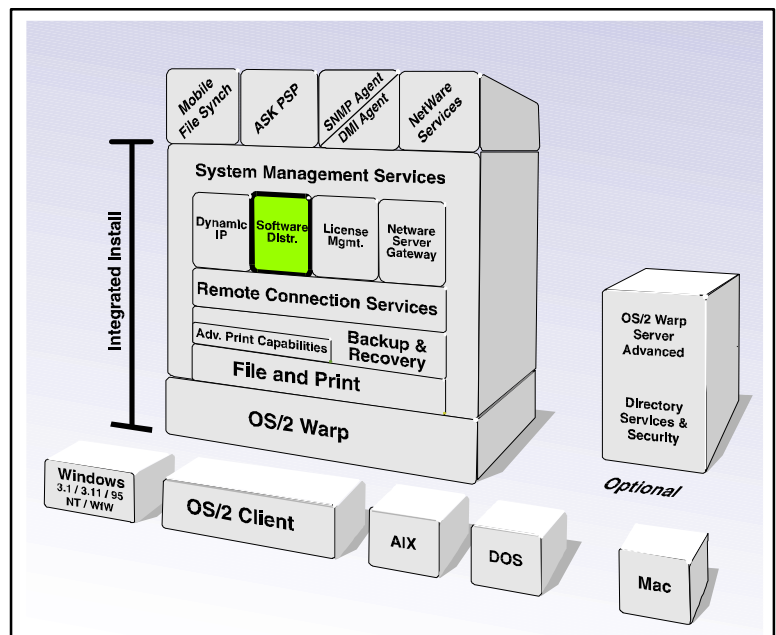
Over the past decade, the number of workstations in organizations has grown steadily. During this time, operating systems and application software have become larger and more complex. In addition, many applications require data or configuration information to be supplied at installation time. All these factors combine to make the task of installing and maintaining workstation software very difficult.

OS/2 Warp Server plays a key role in the trend toward distributing computer power away from central hosts to independent, fully operational systems, such as desktop computers, and workgroup and departmental servers. While this distribution of computing power increases the flexibility and responsiveness of systems, and boosts worker productivity, it presents a significant challenge in terms of centrally managing such tasks as software delivery, configuration, installation, migration, and maintenance.

Traditionally, software delivery, configuration, and installation has been a costly, slow, labor-intensive, manual process that requires a technician to visit each server and workstation to install the software while correctly configuring it for the particular system. With dozens, hundreds, and even thousands of desktop systems and servers spread throughout today's organizations, managers have recognized that the manual process is too slow, cumbersome, and costly. And, as the complexity of the software and systems increases, the process becomes even more time-consuming and difficult, requiring more highly trained technicians to handle the task.

IBM addresses the problem of software distribution with an automated electronic software distribution solution based on an open electronic software distribution and installation architecture called CID. CID takes advantage of the network connecting the vast majority of workstations and servers in the organization, and defines a method that uses redirected input/output on LAN-based client/server systems.

Distributing software and upgrades to even a few machines, let alone hundreds, has always been costly, slow and prone to error...until now.



The primary goals of electronic software distribution are to:

- ♦ Eliminate the need for technicians to go to the workstation and server to perform software installation, configuration, and deployment.
- ♦ Enable the code executing at the workstation or server to perform all required configuration and installation tasks, including the integration of previous customizations.
- ♦ Provide the capability to centralize management and problem-resolution in the position of an administrator at a central site.

OS/2 Warp Server includes a CID-compliant software distribution manager that works in conjunction with the server's software configuration and discovery tools to perform electronic software distribution. It frees organizations from maintaining staffs of technicians who must physically go to each workstation and server to perform software installation, configuration, deployment, and maintenance. Using OS/2 Warp Server software distribution tools, an administrator can effectively distribute, install, configure, and maintain software over the network for dozens or hundreds of systems.

OS/2 Warp Server fully automates the entire installation process by eliminating the need for the user to answer the questions and respond to the prompts at installation through the use of response files, which are product-specific files that automatically provide the correct responses. Combined with redirection, this allows administrators to fully install software unattended over the network.

License Management

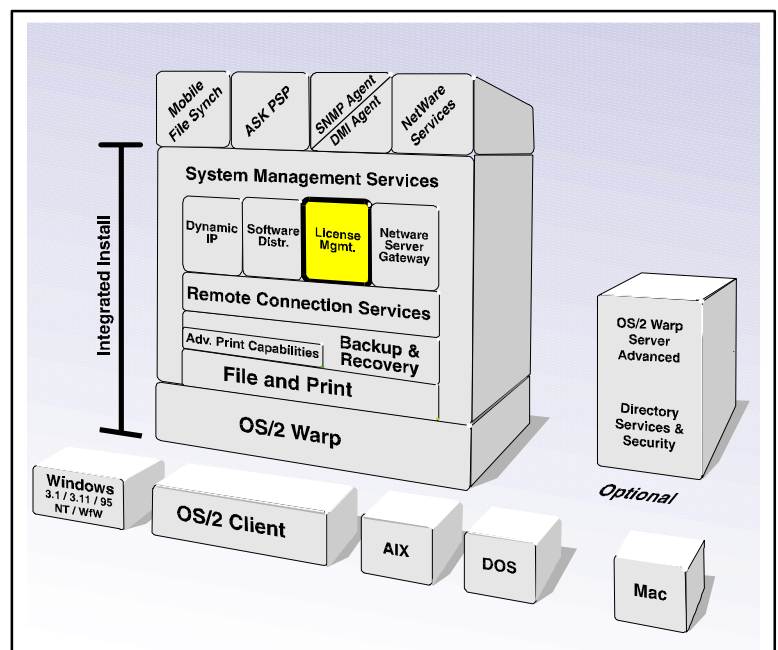
As with software installation, the proliferation of software on workstations and servers throughout an organization has led to a need for license management tools. Software is a valuable asset, one that is vigorously protected as intellectual property, and licensed, rather than sold to the user organization. As a result, organizations must manage this software asset both to leverage the investment in software and to ensure that the organization is in compliance with all license requirements, leaving it prepared for internal and external audits. By effectively managing software licenses, administrators can determine how and when products are used and when additional licenses are required. With the amount of software in distribution, accurate maintenance of licenses has emerged as a complicated, time-consuming, and error-prone administrative chore when performed manually.

A set of tools is included with OS/2 Warp Server to help organizations manage their software licenses. Referred to as SystemView License Management, these tools automate the myriad tasks involved in managing software licenses. License Management products save money by reducing the need for manual license management while ensuring that the organization stays in compliance with its software license requirements.

OS/2 Warp Server's SystemView License Management Runtime for OS/2 lets license administrators monitor and control the use of software that has been enabled for license management by performing the following functions:

- ◆ Collect basic usage statistics and monitor usage levels
- ◆ Inform administrators when users are about to exceed the level of usage to which the organization is entitled
- ◆ Monitor usage restrictions, such as machine type and model, and alerts administrators to potential conflicts
- ◆ Measure software usage for software billing
- ◆ Generate reports and statistics on usage
- ◆ Provide information and documentation to demonstrate license compliance to external and internal auditors.

With the amount of software in distribution, accurate maintenance of licenses has emerged as a complicated, time-consuming chore when



License Management consists of three components:

1. License Server component--installed on one or more workstations in the network, it contains the license information and controls the execution of managed products.
2. Client component--installed on every workstation where a managed product is used.
3. Development component--used by software developers to enable their products for license management. (This is not part of SystemView License Management but is provided in a separate product called SystemView License Use Management Application Developer's Toolkit for OS/2.)

SystemView License Management manages both node-locked licensed products and server-based licensed products. Node-lock licensed products allow the use of a product at the particular node for which the license was created and for as long as the license is valid. Server-based licensed products allows any users on the network to use the product within the terms of the license.

Through license management provided as part of OS/2 Warp Server, organizations are able to collect valuable software usage information, enabling them to maximize the use of their software assets and ensure that they remain in compliance with their license obligations, while substantially reducing the amount of staff time and resources expended on managing software licenses.

NetWare Support

NetWare is a popular network operating system for workgroup and departmental file and print sharing. OS/2 Warp Server, an open system that interoperates with all the systems an organization may deploy, provides a variety of ways to interoperate with NetWare LANs. These include:

- ◆ Providing application server capabilities to NetWare clients.
- ◆ Allowing NetWare clients to use OS/2 Warp Server remote connection services to access all network servers, such as IBM, NetWare, Lotus Notes, and other servers.
- ◆ Supporting gateways to other networks.
- ◆ Providing a migration utility to enable organizations to convert their NetWare LANs to OS/2 Warp Server.

Application Server Capabilities

Specifically in regard to NetWare 3.12 and 4.02, OS/2 Warp Server allows OS/2 Warp Server clients, such as workstations running DOS LAN Services 4.0, or OS/2 LAN Requester 4.0, to perform all the functions listed below with a NetWare server:

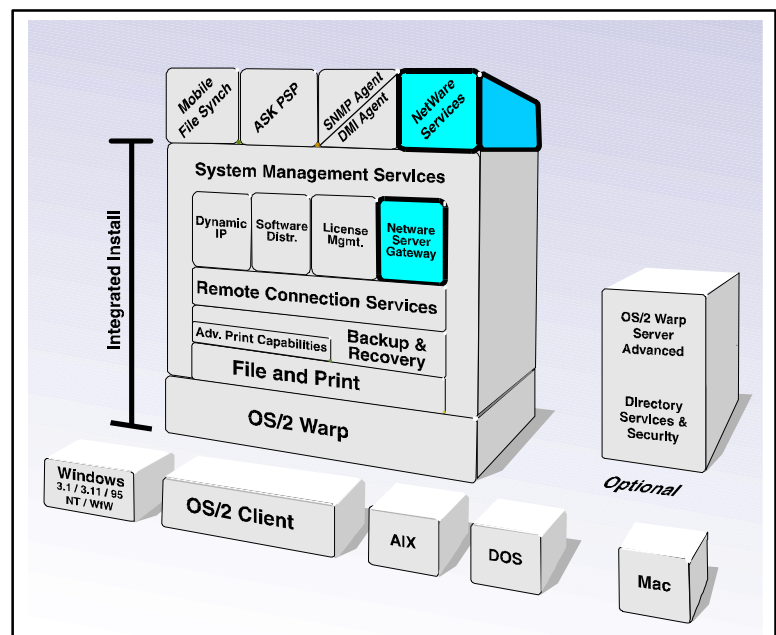
- ◆ Log on to the OS/2 Warp Server, be validated and gateway to NetWare
- ◆ Access the server's resources, including network applications
- ◆ Get home directory assignments (if logon is allowed.)

NetWare Services

NetWare Gateway Service

The NetWare Gateway Service, another method of interoperability, enables OS/2 Warp Server clients to access resources shared by NetWare servers. The OS/2 Warp Server Administrator maps local device names to NetWare resources. Once mapped, OS/2 Warp Server users can log into NetWare through the gateway and use those resources.

OS/2 Warp Server
provides several
ways to
interoperate with
users and servers
on NetWare LANs.



OS/2 Warp Server NetWare Migration Utilities

Through OS/2 Warp Server's NetWare Migration utilities, organizations wishing to standardize their network operating system environments can convert NetWare 2.1x, 2.2x, 3.x, and 4.x (bindery emulation only) networks to an OS/2 Warp Server network (LAN Server 4.0). The Migration Utility is non-destructive and provides the following functions:

- ◆ Disk resource mapping--displays LAN Server disk resources, NetWare volumes, and all levels of NetWare volume directory information. Using a drag-and-drop interface, the administrator can move any directories from NetWare to a defined directory or drive on LAN Server, allowing the administrator to maintain the existing structure or modify it as required.
- ◆ Alias creation and access rights--automatically converts trustee assignments for the mapped directories and files to LAN Server access control permissions, both on a user and group level. The administrator has the opportunity to define rights for any of the groups being migrated in addition to any rights that were already set up.
- ◆ Password option setting--provides four ways to handle users' passwords on the new system: 1) none required or allow to expire, 2) set to user name (expiring at first logon), 3) passwords assigned at random (expiring at first logon), and 4) all passwords set to a common user-supplied default (expiring at first logon).

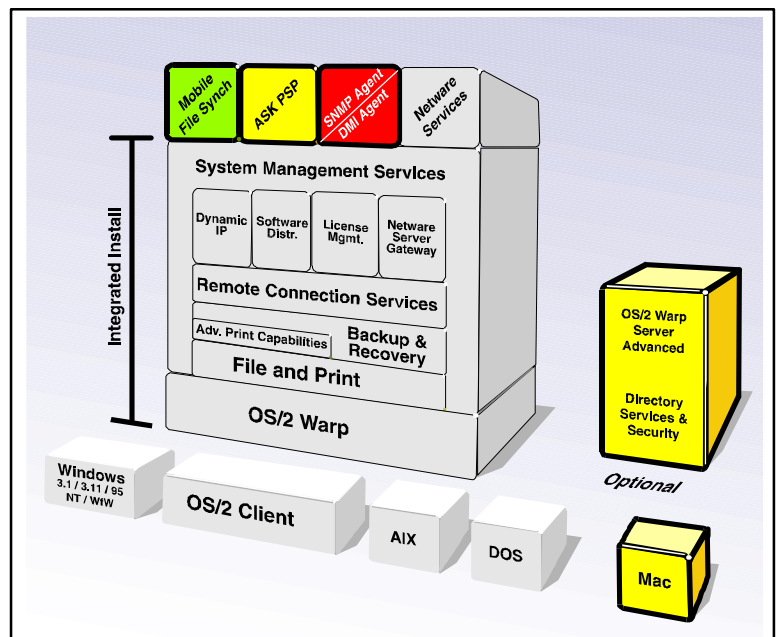
Optional Components (Add-on and Alternatives)

By itself, OS/2 Warp Server provides a comprehensive business server solution that meets the needs of the majority of small and midsize organizations and departments. However, organizations can expand and enhance their use of OS/2 Warp Server through a number of optional components described below.

Optional Components Included in OS/2 Warp Server

The following components are included with OS/2 Warp Server, but are not part of the integrated install:

- ♦ Simple Network Management Protocol (SNMP)--provides support for SNMP. This allows OS/2 Warp Server-based networks to be managed by SNMP-based management systems.
- ♦ Desktop Management Interface (DMI)--provides support for the DMI. This allows DMI-compliant components to be managed by DMI-based management applications running on an OS/2 Warp Server.
- ♦ ASK PSP (Personal Software Products)--a CD-ROM tool that enables troubleshooting using intelligent case-based reasoning. The administrator provides the generic description of the problem, and ASK PSP identifies the most likely causes and recommends the appropriate remedies.
- ♦ Mobile File Synchronization (for OS/2 clients only)--automatically synchronizes the files of mobile users when they reconnect to the network by caching all files touched while connected so they can be worked on while disconnected. It also caches instances where the LAN file has changed since the last connection.



Optional Components Not Included in OS/2 Warp Server

The following optional components are add-ons for OS/2 Warp Server that must be purchased and installed separately.

- ♦ LAN Server for Mac client--extends OS/2 Warp Server client support to Apple** Macintosh clients.

- ◆ Directory Security Service (DSS)--supports the use of heterogeneous platforms, allowing users to access such OS/2 Warp Server resources as applications, files, printers, and modems anywhere in the distributed environment. It simplifies user access by eliminating the need for multiple domain identifications and passwords. It enables resources to be maintained locally, remotely, or centrally. It will enable a single logical view of users on OS/2, Windows 95, Windows NT, Windows 3.x, and DOS file and print client systems as well as DCE-based client machines. It also provides secure information and resource access based on the DCE security architecture that incorporates Kerberos authentication, key-based encryption, and authorization. DSS can be rolled out with no disruption to operations. Since the administration model of DSS is identical to OS/2 Warp Server, no additional administrator education is required.

OS/2 Warp Server Alternatives

OS/2 Warp Server Advanced is an alternative to OS/2 Warp Server that includes all the functionality of OS/2 Warp Server and the following:

- ◆ Disk mirroring for high reliability and fault-tolerant operations
- ◆ High-capacity file sharing system that supports up to 1000 clients
- ◆ Multimedia capabilities through IBM's LAN Server Ultimedia.

OS/2 Warp Server Advanced should be selected where there are more than 120 clients performing file sharing or where fault tolerance is required.

OS/2 Warp Server First Step is an additional alternative--an entry level bundle that includes OS/2 Warp Server plus 10 client licenses at a discounted price.

Target Audience

Within the business user community, OS/2 Warp Server will appeal directly to two core client/server market segments:

1. **Small and midsize businesses**--organizations with one or a few PC LANs. These organizations understand that PC- and LAN-based servers are necessary tools, but they haven't the time and skills to implement and manage sophisticated client/server systems and networks. Nor do they have the resources to hire outside service providers to handle these chores. For these organizations, OS/2 Warp Server provides a nearly turnkey, low-cost solution that they can easily deploy, manage, and maintain on their own. Through single log-on, OS/2 Warp Server allows multiple servers to appear to the user as a single, logical server.
2. **Departments/workgroups**--groups that are part of midsize and large organizations but have many of the same problems and concerns of small businesses. They have none, one, or a few PC LANs. Lacking technical skills and large budgets for IS services, they are forced to buy, deploy, and manage their information technology on their own with little help from corporate IS. Many of these users need to integrate their departmental solutions into the organization's overall enterprise systems environment for the purposes of accessing data, exchanging information, sending e-mail, and sharing applications. OS/2 Warp Server easily ties into the larger, organization-wide information systems environment.

For these groups, OS/2 Warp Server delivers, in effect, *Fortune 500-class technology in a package that any small or midsize organization or department can afford and use.*

The large businesses and institutions--the third core market described previously--are served by corporate MIS. These organizations have sophisticated IS capabilities that they use to create customized client/server solutions tailored to their specific requirements. They want a choice of client, server, and operating environments. These organizations have long deployed much of the technology contained in OS/2 Warp Server, such as LAN Server, OS/2, and SystemView. The use of OS/2 Warp Server by departments within these organizations ensures greater levels of interoperability and compatibility. Through Directory Security Service (DSS) naming and security, these organizations can integrate their extensive heterogeneous systems into a single, coherent, secure system. It also lightens the support load on IS by providing departments with server solutions they can handle by

OS/2 Warp Server delivers, in effect, Fortune 500-class technology in a package that any small or midsize organization or department can afford and use.

themselves while employing technologies with which MIS is experienced. OS/2 Warp Server reduces the integration required, saving time and money, while reducing the IS backlog.

In addition, large organizations will find that OS/2 Warp Server interoperates with their broad variety of systems. It supports backup and recovery services to minicomputers and mainframes from such vendors as IBM, Sun Microsystems, Hewlett-Packard, and Digital Equipment Corp. SystemView provides extensive cross-platform management. Advanced print services enable users to transparently take advantage of a wide range of enterprise print resources. OS/2 Warp Server also provides full interoperability with previous versions of LAN Server and LAN Server for AIX, LAN Server/400, and LAN Server for VM and MVS.

The following parties also have an interest in OS/2 Warp Server.

- ♦ **Management**--OS/2 Warp Server offers a way to provide leading, proven technologies to small organizations and departments without high cost. It allows organizations to deploy business application servers reliable enough for mission-critical work. OS/2 Warp Server can be administered and managed centrally by one or a few administrators. Packed with ease-of-use and sophisticated management features, OS/2 Warp Server reduces the cost of ownership while delivering powerful, flexible client/server computing throughout the organization. It supports efficient business operation through its support of help desk, audit readiness and assets control (software distribution and license management.) It supports investment protection through integration with, and extensions to the heterogeneous enterprise environment, including mainframe- and minicomputer-based systems.

- ♦ **Resellers and independent software vendors (ISV)--OS/2**
Warp Server simplifies the sale of client/server technology by packaging advanced technologies into a single, integrated product. Organizations that otherwise would not be deploying their own client/server systems can easily do so with an OS/2 Warp Server, creating a foundation for flexible, open, scalable client/server business solutions and opening opportunities for ISVs. For both resellers and ISVs, OS/2 Warp Server reduces the burden of education and training, and provides one-stop service and support. OS/2 Warp Server also removes integration and testing as an obstacle: all components are fully integrated and tested, leaving ISVs and resellers free to concentrate on satisfying their customers' needs by integrating their own products, rather than solving IBM compatibility problems.

OS/2 Warp Server allows third-party products to be installed in an integrated fashion with OS/2 Warp. The configurability of OS/2 Warp Server enables users to bypass installation of OS/2 Warp Server functionality when that functionality is being provided by a third-party. For example, a user of the Cheyenne** backup service can bypass the installation of OS/2 Warp Server's Backup and Restore. IBM created OS/2 Warp Server as an open platform for application serving, giving users the choice of server applications, such as databases, groupware, and communications.

Competitive Landscape

OS/2 Warp Server competes primarily with the Microsoft NT Server and Novell NetWare. Other technologies that provide similar business applications and network serving, such as Unix**, proprietary minicomputers, or rolling your own, will not appeal to this target market due to cost, difficulty of use, requirements for technical skills, and compatibility.

Competitive Function Checklist

	OS/2 Warp Server	Other NOS	Other NOS
Server Functionality			
File and print	Y		
Application serving	Y		
WAN directory	Y (DSS)		
Drag and drop administration	Y		
Secure DDNS	Y		
Dynamic DDNS	Y		
System recovery	Y		
Backup/recovery to all media	Y		
Backup/recovery, mini/ mainframe option	Y		
Advanced print services	Y		
Hard disk storage limits	Y (Advanced)		
Built-in system management	Y		
License management	Y		
Aliases, nicknames	Y		
Full directory services (domains)	Y		
Mobile file synchronization	Y		
Internet ready	Y		
Modem sharing	Y		
Remote connection	Y		
DHCP	Y		
Backup to OS/2 Warp Server, NetWare, Windows NT servers	Y		
Advanced Printer Support			
PostScript support for non-PostScript printers	Y		
PostScript support for host printers	Y		
Number of printers supported from server	32		

Systems Management			
Remote console capabilities	Y		
Remote screen capture	Y		
Critical file monitoring	Y		
Software discovery	Y		
Hardware discovery	Y		
Software distribution	Y		
Dynamic alerts	Y		
System management requirement for relational databases	N		
Supports relational databases	Y		
Process monitoring	Y		
Scheduled discovery	Y		
Digital pager support	Y		
Support of the client OS			
DOS (3.x, 4.x, 5.x, 6.x)	Y		
MS Windows 3.x	Y		
Windows for Workgroups	Y		
Windows NT	Y (resource access only)		
Windows 95	Y		
Macintosh (6.0x, 7.x)	with additional software		
OS/2 (1.3, 2.0)	Y		
AIX	with additional software		
Unix	Optional NFS, FTP		
Same user name from all clients	Y		
OS/2 Warp Specifics			
Peer (workgroup support)	Y (OS/2 Warp Connect)		
Driver types	NDIS/ODI		
Number of NICs supported	200-plus		
RPL for diskless workstations	Y		
User interface technology	GUI, command line		
Windows Specifics			
Full workgroup peer support	Y, single session		
Driver types	NDIS third-party drivers		
Number of NICs supported	Nearly 200		

User interface technology	GUI, command line		
DOS RPL support	Y		
Macintosh Specifics			
Included with Warp Server	Add-on		
File services	Y		
Print services	Y		
Client LAN and Protocol Options			
DOS/Windows client protocols	NetBEUI, TCP/IP, IPS/SPX add on, 802.2		
Driver types	NDIS/ODI		
Windows for Workgroups client protocols	NetBEUI, TCP/IP, IPX/SPX		
OS/2 client protocols	NetBEUI, TCP/IP, IPX/SPX, 802.2		
Macintosh client protocols	Apple Ethertalk		
Mac protocol	Appletalk** (add-on)		
UNIX/NFS protocols	Y add-on		
TCP/IP support	Y		
DOS	Y		
Windows for Workgroups	Y		
MS Windows	Y		
OS/2	Y		
Macintosh	Y add-on		
DECnet**	Available separately		
SNA	Y		
FTP	Y		
Special Client Features			
SMP in clients and servers	Y		
DOS GUI client included	Y		
Native support for Windows for Workgroups clients	Y		
Native support for Windows NT clients	Y (resource access only)		
Superuser per server	Y, administrator		
Sub-server group managers	N		
Logon scripts	Y		
Extended logon services	Y		
Security on directories	Y		

Security on files	Y		
Security on printers	Y		
Capture/direct LocalTalk printers	Y		
Management from clients	OS/2, DOS, Windows		
Manage users from server console	Y		
DOS and OS/2 machine names	Y		
File backup	Y		
Server-hosted tape	Y		
Third-party supported	Y		
Backup to AS/400 DASD	Y		
Remote node dial-in	Y		
GUI for server admin.	Y		
Global resource availability	Y		
Multiple Server Administration			
Single utility for all management	Y		
Server-to-server file replication	Y		
Single logon to multiple domains	Y		
GUI for multiple server admin.	Y		
Single NetWare logon	Y		
Single mainframe logon	Y		
Servers manageable from clients	Y		
Single point multiple server mgt.	Y		
Application serving support	Y		
Server Parameters			
Max. # of simultaneous server sessions	1,000		
Max. server volume size	64 GB		
Max. # volumes per server	24		
Max. # printers per server	32		
Max. file size	2 GB		
Max. # of directory entries	No limit		
Max. # concurrent open files per server	64,000		
Max. partition size	64 GB		
Network and System Management Interfaces			
SNMP	Y		
CMIP	Y (add-on)		
DMI	Y		

Network APIs			
NetBIOS	Y		
Named Pipes	Y		
MailSlots	Y		
TCP/IP sockets	Y		
LU 6.2 (over NOS protocol)	Y (add-on)		
AppleTalk	Y (add-on)		
WANs			
Remote station connections	Y		
Remote control	Y		
Modem server on NOS server	Y		
Terminal clients	N		
Remote LAN connections	Y		
Remote connection available	Y		
Router on NOS server or separate	Included		
Resynchronizes files when mobile	Y		
Statistics			
Max. file size	2 GB		
Max. file locks	No inherent limit		
Max. file opens	64,000		
Max. volume size	64 GB		
Max. cache size	512 MB		
Max. RAM	512 MB		
Recommended physical disk space--server	300 MB		
Recommended physical disk space--OS/2 client	50 MB		
Recommended physical disk space--DOS client	8 MB		
Recommended system RAM--server	24 MB		
Recommended system RAM--OS/2 client	12 MB		
Recommended system RAM--DOS client (GUI)	2 MB		
Recommended system RAM--DOS (no GUI)	640 KB		

Technical Highlights

Given the wealth of features and functionality packed into OS/2 Warp Server, its requirements for system resources are relatively modest. OS/2 Warp Server operates comfortably within the configurations available off-the-shelf for PC-based business servers.

System requirements (server)	
CPU	486SX, 486, or higher
RAM	24 MB
Disk storage	300 MB recommended
Floppy drive	1.44 MB, 3.5-inch diskette drive configured as drive A:
Video	VGA video support
Network adapters	Ethernet, Token Ring, PC-Net, FDDI, Dual-Port, IR, ll port
*Client support	OS/2, Windows, Windows for Workgroups, Windows 95, SOA, Windows NT (client), and AIX and Mac (with added software)

* The above client platforms support some or all the functionality of OS/2 Warp Server

Installation

OS/2 Warp Server can be quickly and easily installed by non-technical personnel. Installation has been integrated on a pair of CD-ROMs. By following prompts, an administrator without extensive technical skills can install OS/2 Warp Server. Administrators can choose between an easy, hands-off installation or a customized installation.

The selectable installation features allow the administrator to customize the installation, installing only those components of OS/2 Warp Server that are desired. This saves time and system resources. Components not selected at installation may be installed later, as needed. Selectable installation gives the administrator the freedom to precisely configure OS/2 Warp Server to meet the organization's needs. For example, if there are not remote users requiring access, the administrator doesn't install Remote LAN Access, saving time and system resources. Should remote access become necessary in the future, the administrator can install the capability at that time.

Without OS/2 Warp Server, an administrator would have to install half a dozen or more different packages, a time consuming and technically challenging task by itself, and then test for interoperability.

Once installed, the use of OS/2 Warp Server's built-in CID-enabled software distribution allows automatic installation of subsequent Warp Servers.

Appendix: Driver Support

This document contains a list of Network Interface Cards and NDIS MAC Drivers with which LAN Server or LAN Requester OS/2 on OS/2 Warp Server are supported on uniprocessor systems.

Please note that the device drivers for some of the supported adapter cards are not delivered in the OS/2 Warp Server product. These device drivers should be obtained from the vendor of the adapter card.

NOTE: # = driver is in the product

# 3Com** EtherLink II (3C503)	# IBM LANStreamer* MC 32 Adapter (74G0103)
# 3Com EtherLink II-16 (3C503-16)	# IBM Auto LANStreamer* MC 32 Adapter (60G1592)
# 3Com EtherLink II-16-TP (3C503-16-TP)	# IBM Dual LANStreamer* MC 32 Adapter (73G7137)
3Com EtherLink 16 (3C507)	IBM Auto LANStreamer PCI Adapter (04H8095)
3Com EtherLink 16-TP (3C507-TP)	# IBM FDDI Copper Base ISA Adapter
# 3Com EtherLink/MC (3C523B)	# IBM FDDI Copper Extender ISA Adapter
# 3Com EtherLink/MC-TP (3C523B-TP)	# IBM FDDI Fiber Base ISA Adapter
3Com EtherLink MC-32 (3C527B)	# IBM FDDI Fiber Extender ISA Adapter
# 3Com EtherLink III (3C509)	IBM FDDI Copper Base MCA Adapter
# 3Com EtherLink III (3C509B)	IBM FDDI Copper Extender MCA Adapter
# 3Com EtherLink III-Combo (3C509-COMBO)	IBM FDDI Fiber Base MCA Adapter
# 3Com EtherLink III-Combo (3C509B-COMBO)	IBM FDDI Fiber Extender MCA Adapter
# 3Com EtherLink III-TP (3C509-TP)	# IBM Wireless ISA/MCA LAN Adapter
# 3Com EtherLink III-TP (3C509B-TP)	# IBM Wireless PCMCIA LAN Adapter
# 3Com EtherLink III-TPO (3C509-TPO)	# IBM wIReless LAN ISA Adapter
# 3Com EtherLink III-TPO (3C509B-TPO)	# IBM wIReless LAN MCA Adapter
# 3Com EtherLink III-EISA (3C579)	# IBM wIReless LAN PCMCIA Adapter
# 3Com EtherLink III-EISA-TP (3C579-TP)	# IBM Infrared NDIS MAC Driver for the ThinkPad 755
# 3Com EtherLink III-MCA (3C529)	# IBM Parallel Port
# 3Com EtherLink III-MCA-TP (3C529-TP)	# Intel** EtherExpress 16C (PCLA8100)
3Com EtherLink III-PCMCIA-TP (3C589-TP)	# Intel EtherExpress FlashC (PCLA8105)
3Com EtherLink III-PCMCIA-Combo (3C589B-Combo)	# Intel EtherExpress 16 (PCLA8110)
3Com EtherLink III PCI 10BASE-T Network Adapter (3C590-TPO)	# Intel EtherExpress Flash (PCLA8115)

3Com Fast EtherLink PCI 10/100 BASE-T Network Adapter (3C595-TX)	# Intel EtherExpress 16TP (PCLA8120)
3Com Fast EtherLink EISA 10/100 BASE-T Network Adapter (3C597-TX)	# Intel EtherExpress FlashTP (PCLA8125)
# 3Com TokenLink III (3C619)	# Intel EtherExpress MCA (MCLA8110)
# 3Com TokenLink III EISA (3C679)	# Intel EtherExpress MCATP (MCLA8120)
# 3Com TokenLink III MCA (3C629)	Intel EtherExpress PRO/10 LAN Adapter
3Com TokenLink III 16/4 PC Card (3C689)	Intel EtherExpress PRO/10 PCI
Accton EtherCombo-16 (EN1650)	Intel EtherExpress PRO/100 EISA
Accton EtherPair-16 (EN1651)	Intel EtherExpress PRO/100 PCI (PILA8465)
Accton EtherCoax-16 (EN1652)	# Intel TokenExpress ISA/16S (PCLA8130A)
Accton EtherCombo-32 (EN1200)	# Intel TokenExpress 16/4 LAN Adapter for EISA (EILA8235)
AMD PCnet-32 Ethernet Adapter	# Intel TokenExpress EISA/32 LAN Adapter (EILA8245)
AMD PCnet-ISA II Ethernet Adapter	Kingston Ethernet PCI (KNE40BT)
AMD PCnet-PCI Ethernet Adapter	Kingston EtherRx LC ISA Combo (KNE2021LC)
Allied Telesis Ethernet Adapter Card ISA (AT1500-Plus)	Kingston EtherRx LC ISA TP (KNE2000TLC)
Allied Telesis AT1700 Plus ISA	Kingston TokenRx ISA 16/4 Token-Ring Adapter
Allied Telesis AT1720 Plus MCA	Kingston TokenRx MC 16/4 Token-Ring Adapter
# Artisoft NodeRunner/SI 2000/C	LinkSys Ether16 LAN Card Combo (LNE2000)
# Artisoft NodeRunner/SI 2000/T	LinkSys EtherPCI LAN Card (LNEPCI)
# Artisoft NodeRunner/SI 2000/A	# Madge Smart 16/4 AT PLUS Ringnode (52-03)
# Artisoft NodeRunner/SI 2000M/TC	# Madge Smart 16/4 ISA Client PnP Ringnode
# Artisoft LANTastic NodeRunner 2000/C	# Madge Smart 16/4 EISA Ringnode (52-08)
# Artisoft LANTastic NodeRunner 2000/T	# Madge Smart 16/4 MC Ringnode (54-08)
# Artisoft LANTastic NodeRunner 2000/A	# Madge Smart 16/4 MC32 Ringnode (54-09)
# Artisoft LANTastic NodeRunner 2000M/TC	Madge Smart 16/4 PCMCIA Ringnode
Asante EtherPaC 2000+3	# Madge Smart 100 EISA Ringnode
Asante EtherPaC 2000+N	# Madge Smart 100 AT Ringnode
Asante EtherPaC 2000+T	# Madge Straight Blue 16/4 ISA (62-01)
# Cabletron Ethernet DNI Adapter (E1112)	# Madge Straight Blue ISA Plus Blue Box (62-02)
# Cabletron Ethernet DNI Adapter (E1119)	# Madge Straight Blue MC Blue Box (64-01)

# Cabletron Ethernet DNI Adapter (E2112)	NCR StarLAN Token-Ring ISA
# Cabletron Ethernet DNI Adapter (E2119)	NCR StarLAN Token-Ring MCA
# Cabletron Ethernet DNI Adapter (E3112)	NCR Corporation WaveLAN Adapter
# Cabletron Ethernet DNI Adapter (E3119)	# Olicom USA, Inc. ISA 16/4 Adapter (OC-3117)
# Cabletron Token-Ring DNI Adapter (T2015)	Olicom USA, Inc. ISA 16/4 Adapter (OC-3118)
# Cabletron Token-Ring DNI Adapter (T3015)	Olicom USA, Inc. EISA 16/4 Adapter (OC-3133)
CeLAN FlexLINK - EPCiplus (9910EPCI-B)	Olicom USA, Inc. EISA/32 Adapter (OC-3135)
Cogent eMASTER+ EM960 PCI Ethernet Adapter (EM960C)	Olicom USA, Inc. MCA 16/4 Adapter (OC-3129)
Compaq** NetFlex-2 ENET-TR Controller	Olicom USA, Inc. PCI 16/4 Adapter
# Cray** Communications ScaNet Network Interface Adapter-ISA	Olicom USA, Inc. Pocket Token-Ring Adapter (OC-3210)
# Cray Communications ScaNet Network Interface Adapter-MCA	Olicom USA, Inc. Token-Ring PCMCIA Card (OC-3220)
# DCA** ClassicBlue MC 4/16 Token-Ring Adapter	Proteon ProNET/E PCI Ethernet (p1670)
DCA IRMAtrac EISA	Proteon p1892plus ProNET - 4/16 Plus
DCA IRMAtrac Token-Ring Adapter/Convertible-MCA	Proteon p1392plus ProNET - 4/16 Plus
Digital EtherWorks Turbo 435 PCI	Proteon p1990plus ProNET - 4/16 Plus
Digital EB40-DECchip 21040 Evaluation Board	Racal InterLan EtherBlaster TP-8INT (163-3184)
Digital EB140-DECchip 21140 Evaluation Board	Racal InterLan AT-TP (163-3118)
D-Link Ethernet Interface Card for the PC XT/AT (DE-220C)	Racal InterLan NI5210-16 (163-0610)
D-Link Ethernet Interface Card for the PC XT/AT (DE-220CAT)	Racal InterLan ES3210
D-Link Ethernet Interface Card for the PC XT/AT (DE-220CT)	Racal InterLan ES3210-TP (163-3160)
D-Link Ethernet Interface Card for the PC XT/AT (DE-220T)	Racal InterLan MCA (163-3142)
D-Link Ethernet Card for EISA bus PC (DE-400)	Racal InterLan MCA-TP (163-3143)
D-Link Ethernet VESA Combo Card (DE-500CAT)	Racal InterLan PCI T2 (163-3215)
D-Link Ethernet PCI (DE-530CT)	Racal InterLan T/R 16/4 ISA (167-3193)
# Eagle** Novell NE2000	Racal InterLan T/R 16/4 MCA (163-3137)
# Eagle Novell NE2000T	# Racore Computer Products, Inc. Token-Ring ISA
# Eagle Novell NE2000plus	# Racore Computer Products, Inc. Token-Ring MC
# Eagle Novell NE2000Tplus	# SMC EtherCard PLUS (8003EB)

# Eagle Novell NE2000plus-3	# SMC EtherCard PLUS/A (8003E/A)
# Eagle EtherXpert EP2000plus	# SMC EtherCard PLUS Elite (8003EP)
# Eagle EtherXpert EP2000Tplus	# SMC EtherCard PLUS Elite 10T (8003WC)
# Eagle Novell NE3210	# SMC EtherCard PLUS Elite 16T (8013WC)
# Eagle EtherXpert EP3210	# SMC EtherCard PLUS Elite 16 (8013EPC)
Hewlett-Packard 27247B	# SMC EtherCard PLUS Elite 16 Combo (8013EWC)
Hewlett-Packard PCLAN Adapter/16 PLUS (27252A)	# SMC EtherCard PLUS Elite/A (8013EP/A)
Hewlett-Packard 10/100VG PC LAN ISA Adapter (J2573A)	# SMC EtherCard PLUS Elite 10 T/A (8013WP/A)
Hewlett-Packard 10/100VG PC LAN EISA Adapter (J2577A)	# SMC EtherCard Elite 16 Ultra (8216)
Hewlett-Packard 10/100VG PC LAN PCI Adapter (J2585A)	# SMC EtherCard Elite 16C Ultra (8216C)
# IBM LAN Adapter for Ethernet (48G7169)	# SMC EtherCard Elite 16T Ultra (8216T)
# IBM LAN Adapter for Ethernet CX (60G615)	# SMC EtherEZ 10BASE-T ISA (8416T)
# IBM LAN Adapter for Ethernet TP (60G0605)	# SMC EtherCard Elite32C Ultra (82M32C)
# IBM Credit Card Adapter for Ethernet 10B2 (0933280)	SMC EtherPower 10BASE-T PCI Ethernet Adapter (8432T)
# IBM Credit Card Adapter for Ethernet 10BT (0933290)	SMC EtherPower Combo PCI Ethernet Adapter (8432BT)
# IBM Credit Card Adapter II for Ethernet 10B2 (0934330)	SMC EtherPower 10/100 Fast Ethernet PCI Adapter (9332DST)
# IBM Credit Card Adapter II for Ethernet 10BT (0934331)	# SMC TokenCard Elite (8115T)
# IBM Adapter/A for Ethernet Networks (6451091)	# SMC TokenCard Elite/A (8115T/A)
# IBM Adapter/A for Ethernet Twisted-Pair Networks (6451136)	# SMC TokenCard Elite Master32 (83M32)
# IBM LAN Adapter/A for Ethernet (48G7171)	# Texas Instruments, Inc. TokenLite Token-Ring Adapter
# IBM EtherStreamer MC 32 Adapter (59G9066)	Thomas-Conrad Ethernet PCI (TC5048-T2)
# IBM Dual EtherStreamer MC 32 Adapter (73G7136)	# Thomas-Conrad 16/4 Token-Ring Adapter/AT (TC4045)
IBM Ethernet Quad-BT PeerMaster Server Adapter (06H5184)	# Thomas-Conrad 16/4 Token-Ring Adapter/MC (TC4046)
IBM Ethernet Quad-B2 PeerMaster Server Adapters (06H6041)	# Thomas-Conrad Tropic 16/4 Token-Ring Adapter/AT (TC4043)
# IBM Token-Ring Network PC Adapter	# Ungermann-Bass NIUpc Adapter
# IBM Token-Ring Network PC Adapter II	# Ungermann-Bass NIUps Adapter

# IBM Token-Ring Network 16/4 Adapter	Xircom External Token-Ring Adapter (ET16BU)
# IBM Token-Ring Network 16/4 ISA-16 Adapter (73G2032)	Xircom Pocket Token Ring Adapter III (PT3-16CTP)
# IBM Token-Ring Network 16/4 Adapter II	Xircom CreditCard Token Ring Adapter (CT-16CTP)
# IBM Auto 16/4 Token-Ring ISA Adapter (92G7632)	Xircom Pocket Ethernet Adapter III (PE3-10BT)
# IBM Token-Ring 16/4 Credit Card Adapter (0933462)	Xircom Pocket Ethernet Adapter III (PE3-10BC)
# IBM Token-Ring 16/4 Credit Card Adapter II (0933931)	Xircom Pocket Ethernet Adapter III (PE3-10BX)
# IBM PCMCIA Token-Ring Adapter (04H6922)	Xircom CreditCard Ethernet Adapter (CE-10BC)
# IBM 16/4 Busmaster EISA Adapter (1051712)	Xircom CreditCard Ethernet Adapter (CE-10BT/A)
# IBM Token-Ring Network Adapter/A (69X8138)	Xircom PS-CreditCard Ethernet Adapter (PS-CE2-10BT)
# IBM Token-Ring Network 16/4 Adapter/A (16F1133)	
# IBM Token-Ring Network 16/4 Adapter/A (74F9410)	
# IBM Auto 16/4 Token-Ring MC Adapter (92G7682)	
# IBM Token-Ring Network 16/4 Busmaster Server Adapter/A (74F4140)	
# IBM LANStreamer MC 16 Adapter (74G0801)	

Appendix: Features Matrix

FEATURE	BENEFIT
File and print sharing	Increased worker productivity, efficient use of resources
Application serving	Improves responsiveness and flexibility, reduces costs
Remote access	Increased productivity of remote workers
TCP/IP	Improved interoperability, connectivity, openness
DHCP/DDNS	Saves the time, effort, and cost of configuring each client individually with the correct IP address
Single system view	Improved ease of use, efficiency
Multiple print stream conversion	Saves time, more efficient use of resources
Backup/restore, archiving	Increases reliability, ensures recovery from failures, saves money
Systems management	Reduces the ongoing cost of support, improves system reliability, availability
Remote Connection Service	Allows efficient support for remote users, provides centralized management of remote systems
Electronic software distribution	Reduces the time and effort required to install software, saves money
Ease of use	Increases administrator efficiency, reduces cost of administration
User interface	Increases ease of use, productivity
Hardware/software inventory	Improves management and planning, enables preventive maintenance, improves troubleshooting
Event scheduling	Automates functions to reduce administrative burden and cost
Client support	Leverages investment in existing systems
Preemptive multitasking	Provides high performance, stable operating system environment and reliable application server platform

License management	Allows efficient management of software assets, ensures software license compliance, while reducing the time and resources required to manage licenses
NetWare interoperability	Leverages investment in existing systems
Integrated installation	Ease of installation, eliminates the need for highly trained technicians
Selectable installs	Saves system resources, save time

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¹ OS/2 Warp Server consists of the OS/2 operating system plus IBM and other separate networking products.

